Improvement of Ultrasonically Assisted Chronic Wound Healing Applicator
Team 01: Peter Khouri, Lila Lin, Kristian Wagner, Kah Young
Advisors: Dr. Lewin, Dr. Schafer, Karissa Barbarevech, Jacob Hyatt

**PROBLEM**
Chronic wounds affects **6.5 million people** in US
Long healing time + **$25 billion cost** annually
- Current ultrasound applicator device is incapable of monitoring and recording patient treatment information

**Constraints**
1. Existing solution
2. Wearability
3. Budget
4. COVID-19 Policies

**Requirements**
1. One-click to start treatment
2. Automatic shutoff to end treatment
3. Overtreatment prevention
4. Patient usage data logging

**TESTING**

<table>
<thead>
<tr>
<th>Req.</th>
<th>Verification Result</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Desired signal triggered upon start</td>
<td>Pass ✓</td>
</tr>
<tr>
<td>2</td>
<td>Treatment Duration: <strong>902 ± 1.53 seconds</strong></td>
<td>Pass ✓</td>
</tr>
<tr>
<td>3</td>
<td>Allowed one treatment every <strong>21 hours</strong></td>
<td>Pass ✓</td>
</tr>
<tr>
<td>4</td>
<td>Timestamp accuracy: <strong>3.25 ± 2.31 seconds</strong></td>
<td>Pass ✓</td>
</tr>
</tbody>
</table>

**REALIZATION**

- Push button
  - Starts the treatment
- Microcontroller
  - Control Center
  - Records and maintains time
- Real Time Clock
- SD Card
  - Starts the timer and saves data
- Buzzer
  - Alerts user upon completion
- Ultrasound Healing Applicator
  - Provides treatment

**FUTURE & IMPACT**

**Impact:**
- Improve safety by preventing overtreatment
- Enable patient compliance monitoring

**Future Revisions:**
- Perform pilot testing, then redesign enclosure to better optimize for at home use